SYSTEMS AND METHODS FOR SHARING CAMERA SETTING CONTROL AMONG MULTIPLE IMAGE PROCESSING COMPONENTS IN A VEHICLE

FIELD OF THE DISCLOSURE

[0001] This disclosure generally relates to vehicles, and more particularly relates to systems and methods for image processing operations carried out in a vehicle.

BACKGROUND

[0002] Many vehicles employ one or more cameras for various purposes. For example, a camera mounted on a grille of a vehicle may be coupled to an electronic assembly having a first image processing component that processes images in a video feed provided by the camera in order to detect other vehicles traveling in front of the vehicle. The electronic assembly can use information obtained through the image processing operation and communicate with a vehicle controller for executing automatic braking operations when the information indicates that the vehicle is travelling too close to another vehicle ahead and that there is a risk of rear-ending the other vehicle.

[0003] The electronic assembly may also have a second image processing component that processes images in the video feed that may be inspected by an individual for insurance purposes. The image processing may be directed at obtaining information to identify certain events that may have taken place during an accident, prior to the accident, and/or after the accident involving another vehicle. The information may indicate that the accident occurred as a result of the other vehicle abruptly changing lanes without using a turn signal. Such information may be used to file an insurance claim and/or to file a police report.

[0004] As can be understood, the camera in the example described above is being used to capture images that are used for two different purposes—one that is associated with vehicle operations and the other for obtaining accident-related information that may be reviewed by an individual. When used for capturing images for use in carrying out vehicle operations, it may be desirable to configure the camera settings of the camera in a certain manner. For example, it may be desirable to provide camera settings such as a high frame repetition rate, a focused field-of-view, and good color balance that would enable the first image processing component to process images for detecting moving objects quickly and accurately in the lane in which the vehicle is moving. On the other hand, when used for capturing images for obtaining accident-related information, it may be desirable to configure the camera settings of the camera in a different manner. For example, it may be desirable to provide camera settings that produce images having high resolution and a wide field-of-view. The wide field-of-view may allow the image processing component (or other detection components such as radar or lidar) to monitor the other vehicle traveling in an adjacent lane prior to changing lanes.

[0005] In this example, the processing carried out by the first image processing component may be deemed to have a higher priority than that carried out by the second image processing component because it is more important to avoid rear-ending the vehicle traveling in front than it is to file an insurance claim or a police report after the accident has occurred. Typically, in conventional practice, the camera settings on the camera is set to cater to the requirements of the first image processing component and the second image processing component has to accept these settings and execute its own functions in a sub-optimal manner.

[0006] It is therefore desirable to provide a solution that would allow camera settings of a camera to be changed in order to cater to different image processing functions in a vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] A detailed description is set forth below with reference to the accompanying drawings. The use of the same reference numerals may indicate similar or identical items. Various embodiments may utilize elements and/or components other than those illustrated in the drawings, and some elements and/or components may not be present in various embodiments. Elements and/or components in the figures are not necessarily drawn to scale. Throughout this disclosure, depending on the context, singular and plural terminology may be used interchangeably.

[0008] FIG. **1** shows an exemplary vehicle equipped with multiple cameras.

[0009] FIG. **2** shows a first exemplary embodiment of a system for sharing camera setting control of a camera of the vehicle in accordance with the disclosure.

[0010] FIG. **3** shows a second exemplary embodiment of a system for sharing camera setting control of a camera of the vehicle in accordance with the disclosure.

[0011] FIG. **4** illustrates some exemplary components that may be included in an access arbitrator used for configuring the multiple cameras of the vehicle in accordance with the disclosure.

[0012] FIG. **5** shows an exemplary flowchart of a method of operation of an access arbitrator in accordance with the disclosure.

DETAILED DESCRIPTION

[0013] Overview

[0014] In terms of a general overview, this disclosure is generally directed to systems and methods for sharing a video feed of a camera among multiple image processing components in a vehicle. In an exemplary method, a first priority is applied to a first image processing component that performs a first image processing function upon the video feed provided by the camera. A second priority that is lower than the first priority, is applied to a second image processing component that performs a second image processing function upon the video feed. One or both of the image processing components can be an integrated circuit, such as, for example, a System-on-a-chip (SoC), an application specific integrated circuit (ASIC), or a field programmable gate array (FPGA). The first image processing function may be deemed to be more important than the second image processing function based on various criteria, such as, for example, based on safety considerations. The first image processing component may be allowed to apply various camera settings on the camera and may do so based on various considerations associated with the first image processing function. In some cases, these camera settings may not be optimal for the second image processing component. The first image processing component may relinquish control of the camera settings at various times so as to allow the